

Incorporating the Family into the Electronic Medical Record System with a Relational Database Design

Tzeng-Ji Chen, Dr. med.

Department of Family Medicine, Veterans General Hospital-Taipei
Taipei, Taiwan, R.O.C.

Background. A traditional family chart system means a medical record system in which the records of all members belonging to a family are deposited in the same folder. When one patient visits the practice, all charts of his family are retrieved to facilitate the physician's care of the family. Besides the individual charts of each member, the family folder also contains some common records of the family [1]. However, to maintain paper-based family charts is laborious and time-consuming. The definition of a family is often arbitrary and the dynamic structure of a family can not be managed efficiently. The way of coding and filing also affects the chart organization. For these reasons, the traditional family chart system, though important for the family practice, seems to enjoy very limited popularity.

Up to now, there are only a few attempts to simulate the family chart system on the basis of the electronic medical record system. Moreover, they still stay within the earlier stages of the database management system (DBMS): (1) sequential file model: linking the records of family members by means of telephone number or address; (2) hierarchical data model: coding the members of a family together according to household of residence and linking by the main part of the codes [2,3]. Although this two kinds of methods can retrieve the records quickly on the computer, they can not yet overcome all the shortcomings of the traditional family chart system. The purpose of this project is to develop a new system of the family-oriented electronic medical record utilizing a recursive relational database model.

System. The system constructs a many-to-many recursive relationship. An intersection table (named *Connect* in the entity-relationship diagram below) is created to join the main table *Patient* ($Patient.ID = Connect.ID$) on one hand and the copy of the main table *Patient_1* ($Patient_1.ID = Connect.ID_1$) on the other.



Patient (*ID*, Name, Sex, BirthDate, ...)
Patient_1 (*ID*, Name, Sex, BirthDate, ...)
Connect (*ID*, *ID_1*, Salutation, Salutation_1, ...)

Another feature of the system is the fields of Salutation in the intersection table. After the user selects one relative of a patient in the *ID_1* field and specifies his greeting name (e.g. father) in the *Salutation* field, a procedure is evoked to fill an opposite greeting name (e.g. daughter or son) in the *Salutation_1* field based on the sex and birth dates of both people. The procedure will also add (or correct) one row in the *Connect* table with transposition of *ID* / *ID_1* and *Salutation* / *Salutation_1* values.

Evaluation. Through the intersection table, the user can link one patient with his relatives and thus jump between the records. This system is based on the relationship of each other and will not be affected by change of domicile. It can also be extended to circles of friends. Consecutive linkages will constitute a network of blood, marital, and social relations.

Conclusions. The recursive relational model offers a function of hyperlinks. Its many-to-many type can clearly represent the complex interpersonal relationships. The promising application of this proposed system to the office-based family-oriented epidemiological research deserves more attention in the future.

References

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